Large Forest Owls in the River Red Gum State Forests of south-western New South Wales - an account of their 2008 status

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ABSTRACT

This survey aimed to determine whether Barking Owls *Ninox connivens* are still declining in south-west NSW; and if there are resident pairs of Powerful Owls *Ninox strenua* present in south-west NSW State Forests. Surveys for Barking Owls were conducted in and around eight locations they had been detected in 2004. During August 2008, call playback for Barking Owls was conducted in 175 sites at and surrounding these locations for a single night each. Powerful Owl calls were played at 12 of these sites. From the eight locations where Barking Owls were detected in 2004, only one was detected in 2008. A Powerful Owl was detected at one site during surveys and a pair seen there the following year, suggesting residency. In regards to the initial aims, Barking Owls appear to be declining, and Powerful Owls are present in south-west NSW State Forests. This needs to be incorporated into conservation strategies for both species.

Key words: Barking Owl, Powerful Owl, threatened species, distribution

Introduction

Two of the largest native predators left in rural southern Australia are the Barking Owl *Ninox connivens* and the Powerful Owl *Ninox strenua*. As top predators high in the trophic cascade, they are expected to be at a particularly high risk of extinction from habitat fragmentation and degradation. This is because they have comparatively low abundances, they require a constant source of nutritious food that typically takes substantial energy to hunt, kill and digest; and therefore requires an abundant prey source and large hunting grounds (Currie and Fritz 1993, Gittleman *et al.* 2001). Both large owl species are listed as Vulnerable in New South Wales (NSW *Threatened Species Conservation Act* 1995).

The Barking Owl is the smaller of the two owl species, and typically lives in flat, open and productive forests and woodlands. They are territorial, with average home ranges in south-east Australia averaging around 1400 hectares and ranging from about 800 ha to 8000 ha (Schedvin *et al.* 2001, Schedvin 2007, Kavanagh and Stanton 2009). With such large home ranges, they also require large areas of habitat. In our study area of south-west New South Wales (also referred to as the Riverina), they are principally found in grassy box woodland, riparian forests and floodplain forests fringing wetlands (Kavanagh et al. 1995, Taylor *et al.* 2002, Parker *et al.* 2007). Much of this habitat has been cleared for agricultural development (especially grassy box woodland), is highly fragmented and is poorly represented in the existing networks of nature reserves (Lunt and Bennett 1999).

Degradation of remaining habitat would also have affected the Barking Owl in south-western NSW. The extensive silvicultural practices in most of the region's remaining forests have substantially reduced the number of large hollow-bearing trees (Dexter 1978, Donovan 1997, Taylor *et al.* 2002), which they require for nesting and roosting. Much of their prey would have declined in abundance in recent years (e.g. rabbits, arboreal mammals and waterbirds like swamphens) due to a range of factors including Calici-virus, removal of large hollow-bearing trees, fox predation, and reduced flooding from drought and river regulation (Chesterfield 1986, Bren 1988, Parkinson *et al.* 2002).

The decline of the Barking Owl in south-west NSW appears to have occurred recently (Taylor *et al.* 2002). Between 1950 and 2000, they were described by leading authorities on local birds as "not uncommon" (Hobbs 1961, pg 37) and "often heard" (Disher 2000, pg 33) throughout the area's River Red Gum forests. This description is in stark contrast to their present status. A comprehensive survey of large owls at 261 sites within 71 of the region's State Forests in 2004 only recorded them at seven sites (plus two incidental records) from six state forests (Parker *et al.* 2007). Also, there was only one known record in south-west NSW outside of the State Forests estate since 2004: the Narrandera Town Common (Smith 2008). Since 2004, some of these forests have been further logged and all have suffered from the longest drought in the region since records began in 1900 (*source:* Bureau of Meteorology, Australia). It is quite possible that their already precarious situation in 2004 is now even worse in 2008 (Schedvin 2007).

Powerful Owls are Australia's largest owl, and predominantly eat small to medium sized arboreal mammals like Ring-tail Possums *Pseudocheirus peregrinus* and Gliders *Petaurus*

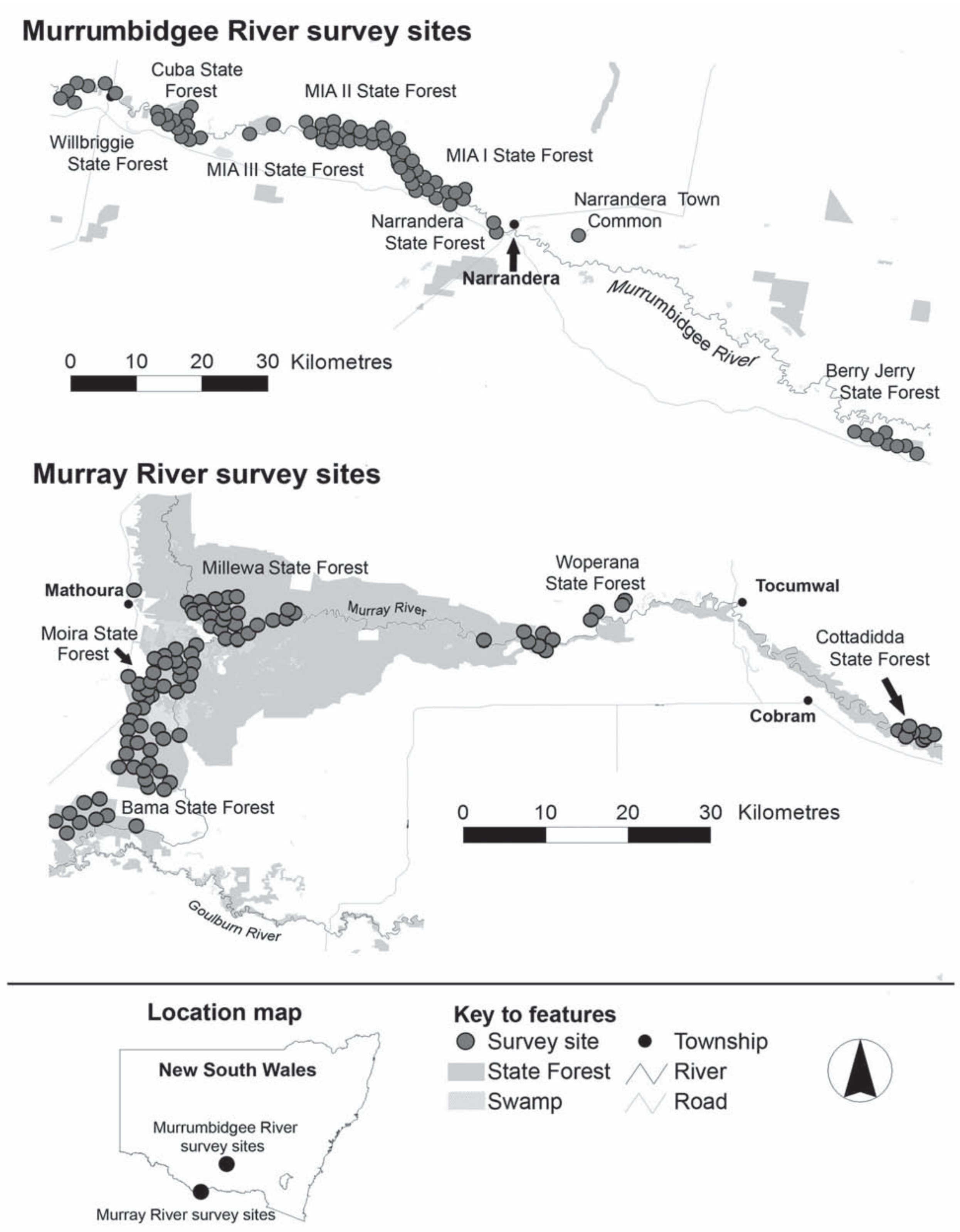
Murrumbidgee River survey sites
Cuba State Forest
MIA II State Forest
Willbriggie State Forest
MIA III State Forest
MIA I State Forest
Narrandera Town Common
Narrandera State Forest
Narrandera
Murrumbidgee River
Berry Jerry State Forest
0 10 20 30 Kilometres
Murray River survey sites
Millewa State Forest
Woperana State Forest
Mathoura
Tocumwal
Murray River
Moira State Forest
Cottadidda State Forest
Cobram
Bama State Forest
0 10 20 30 Kilometres
Goulburn River
Location map
New South Wales
Murrumbidgee River survey sites
Murray River survey sites
Key to features
Survey site
Township
State Forest
River
Swamp
Road

Figure 1. Maps of the Barking Owl survey sites used in this study

spp. (Kavanagh 2002). Although this species is mostly associated with productive tall forests of the Great Dividing Range (Higgins 1999), there are infrequent records of owls along riparian habitats in semi-arid areas (Tzaros 2003) and therefore the potential that they inhabit State Forests of south-western NSW. The only known records are two non-resident reports in Perricoota State Forest and a resident pair on private land near the township of Mulwala in 2006 (Herring *et al*. 2008). As there were no records of resident pairs in the state forests of south-west NSW in 2008, there are currently no forestry impact mitigation previsions for this species (GHD 2009).

Considering the differences in past distribution and status of these two large forest owls, a specific question was posed for each species in order to assess their 2008 status:

- Are Barking Owls still declining in south-west NSW?
- Are resident pairs of Powerful Owls present in south-west NSW State Forests.

Methods

This survey was based in the River Red Gum *Eucalyptus camaldulensis* forests along the Murray and Murrumbidgee Rivers in south-western New South Wales. Annual rainfall across the study area is typically between 300–400 mm per year (*source:* Bureau of Meteorology, Australia), but all River Red Gum forests surveyed also receive water from river flows or floods.

To determine whether Barking Owls are still declining in south-west NSW, I repeated surveys at as many of the locations as possible where they were detected during 2004–2005. These included seven of the nine locations where the species was recorded by Parker *et al.* (2007), in Bama, Berry Jerry, Cottadidda, MIA I, and Moira State Forests. Two of the 2004 locations in Perricoota State Forest could not be sampled due to logistical reasons. A survey was also conducted in the Narrandera Town Common (also known as the 5 Mile Travelling Stock Reserve) where Barking Owls have previously been detected by the Murrumbidgee Field Naturalists (Smith 2008). Neighbouring State Forests were surveyed on an informal basis; including Cuba, MIA II, MIA III, Murrumbidgee, Thornley State Forests and the south-western and far-eastern portion of Millewa State Forest.

For Barking Owl surveys, all roads within each of the above forests were driven over August 2008 and a call-playback site was selected at approximately every 1.5 kilometre interval (except Millewa State forest where only east and south-west fringes were sampled). Site distance was set to 1.5 kms as it is the approximate distance that call playback can be audible to the human ear. Survey of a large number of sites at close proximity was warranted given that during August, females usually incubate eggs and only males are likely respond to call-playback. This sampling strategy ensured almost all of each State Forest surveyed was included within the 1.5 km radius of at least one site, with the exception of parts of Moira State Forest (areas that either were open wetlands or recently burnt in wildfire) and most of Millewa State Forest.

Survey protocol at each site consisted of intermittently broad-casting pre-recorded territorial calls of Barking Owls over a mega-phone for three minutes, followed by 20 minutes of listening and spotlighting, resulting in a minimum of 23 minutes spent at each site (Debus 1995). This followed DECC (2005) guidelines with the exception that there was not 20 minutes of listening before calls were broadcast. All surveys were conducted by David Webb and Hugh McGregor, on nights with light wind and no rain. An extra hour of listening and spotlighting around dusk was conducted at each specific location that Barking Owls were detected in 2004 (based on the GPS locations provided to the NSW Wildlife Atlas).

To determine whether Powerful Owls were present in south-west NSW State Forests, a subset of the Barking Owl sites were also surveyed for this species. These sites were chosen in the field, with all sites that appeared to be ideal habitat sampled (i.e. many dense large River Red Gums). Twelve such sites were surveyed. Three minutes of intermittent territorial calls for this species were broadcast followed by 20 minutes of listening and spotlighting before the Barking Owl survey were implemented. This resulted in a minimum of 46 minutes at each Powerful Owl site.

Results

Two records of large forest owls were obtained from 175 survey sites and approximately 70 human hours of survey. One Barking Owl was recorded at the Narrandera Town Common among a number of old hollow-bearing trees surrounding a permanent lake. At 18:00 hours on the 20th August 2008, a male approached and called within one minute, followed by a second bout of calling 11 minutes later. Both observers had clear prolonged views (> 15 minutes). Whilst only one bird was detected, subsequent visits by the Murrumbidgee Field Naturalists established that this male had a female companion (Williams 2009).

A Powerful Owl pair was recorded in the central block of Cottadidda State Forest, approximately 20 km west of the township of Mulwala/Yarrawonga. At 18:20 on 27th August 2008, calls were heard by the author. A single owl responded to call playback approximately 10 minutes afterwards. It called eight times, then 10 minutes later called another five times. Through triangulation, I was able to establish it's location to within 20 m, yet was unable to gain visual confirmation. To determine whether the owl was resident, I returned to Cottadidda State Forest one year later in September 2009. A pair was detected at 19:50 on the 6th of September 2009 at the far-western corner of the forest. A male responded to call playback after 10 minutes, and two observers (Katherine Tuft and Hugh McGregor) were able to locate both him and his female companion at the top of an old tree with sustained views for half an hour.

Nine other nocturnal vertebrate species were detected during this survey. The Boobook Owl *Ninox novaeseelandiae* was recorded at 58 sites (33%), Barn Owl *Tyto alba* at 7 (4%), Owlet Nightjar *Aegotheles cristatus* at 22 (13%), Tawny Frogmouth *Podargus strigoides* at 27 (15%), Brushtail Possum at 76 (43%), Ringtail Possum *Pseudochirops peregrinus* at 7 (4%), Koala *Phascolarctos cinereus* at 4 (2%), Sugar Glider *Petaurus breviceps* at 5 (3%), and the Squirrel Glider *Petaurus norfolcensis* at 2 sites (1%). Note that Boobook Owl, Barn Owl and Tawny Frogmouth data did not come from entirely independent samples, as the same bird could have been heard from two different plots.

Discussion

The Barking Owl population in south-western New South Wales is evidently in worse condition in 2008 than in 2004. Of the eight locations surveyed where Barking Owls were detected in 2004, only one pair of owls was recorded in 2008. None were detected in any of the neighbouring

State Forests surveyed. Not only was just a single pair found during this survey, no other sightings of this species have been reported in south-west NSW over 2007–2008 among any known network of observers (NSW Wildlife Atlas (DECC 2009), NSW Bird Atlassers (D. Cooper pers. comm.), Echuca and District Bird Observers Club of Australia, Murrumbidgee Field Naturalists (All newsletters between 2007–2008 of both organisations checked, and confirmation emails acquired)

The limitations of this study mean it is possible there are still Barking Owls in these or surrounding forests. As survey timing corresponded with Barking Owls' regular nesting time, if pairs were breeding, then only males would be likely to respond to call playback, effectually halving survey success. Also, detection probabilities of large forest owls at sites surveyed only once are generally low (Wintle *et al.* 2005). Even so, it is unlikely that there were males defending home-ranges over all seven locations that Parker *et al.* (2007) detected owls, and this survey should at least suffice as a comparison. Survey intensity was around four times greater than Parker *et al.* (2007) per State Forest (e.g. 11 versus 44 sites in Moira, 5 versus 22 in MIA I), at a similar time of year, almost all of each state forest surveyed was within a 1.5 km radius of a site (exceptions outlined in methods) and birds have been known to travel between three and five kilometres to respond to call playback (Soderquist 2009). Owls might have moved right out of the particular areas where they were detected in 2004, but it is unlikely that all seven owls moved. Many adjacent River Red Gum State Forests were surveyed, including all other forests along the Murrumbidgee. Although there were some other large adjunct patches of native vegetation for a pair to move to (e.g. Buckingbong State Forest, Barmah State Park in Victoria), it is still worrying that there have been no other known records in these forests. It is possible that owl pairs detected in 2004 were still present but either did not have the energy to defend territories through calling in 2008. However, even in this 'best-case scenario' the distinction between the 2004 and 2008 results suggest a decline in the condition of remaining birds. Although this study does not provide evidence that seven out of the eight Barking Owls detected in 2003–2005 have perished, it still provides a strong indication of a decline.

Habitat clearing and logging are likely causes of historical Barking Owl population fragmentation and decline (NPWS 2003). However, it is likely that the ongoing drought contributed to this recent decline. Wetlands have been suggested as being both a drought refuge and/or general habitat requirement for this species in south-eastern Australia (Kavanagh *et al.* 1995, Taylor *et al.* 2002), yet few wetlands in south-west NSW State Forests have received flood water over the last four years. None of the forests surveyed where owls were not detected had a filled wetland. Considering the only site surveyed with a watered wetland (the Narrandera Town Common) was the only site with Barking Owls, protecting large tracts of forests around such permanent or semi-permanent lakes and wetlands (e.g. Lake Mulwala) may provide the best opportunity to conserve this species in south-west New South Wales.

The Powerful Owl at Cottadidda State Forest was one of the first formal records of this species in south-western NSW. The River Red Gum forests within and surrounding Cottadidda State Forest appear to be more ideal habitat for this species than the other State Forests surveyed (e.g. Moira). Tree health and general productivity have been found to be comparatively greater in this area (Cunningham *et al.* 2007). This and neighbouring forests contain far greater numbers of hollow-bearing trees (GHD 2009, personal observation), and unlike most other sites surveyed, the forest has a dense understorey of Silver Wattles *Acacia dealbata* which presumably support high densities of gliders (Suckling 1984, Menkhorst *et al.* 1988, Irlbeck and Hume 2003, Webster *et al.* 2003). It is possible there are a number of other pairs further upstream on both sides of the river due to similarities of habitat.

There is a possibility for competition between Barking Owls and Powerful Owls at Cottadidda State Forest. Barking Owls were detected here in 2004, yet only Powerful Owls were recorded here in 2008 and 2009. A similar occurrence has been reported in Chiltern/Mt Pilot National Park (Schedvin 2007). Diets of the two owl species slightly overlap (Tilley 1982, Kavanagh *et al.* 1995), and instances of shared home-ranges are rare. None of this is direct evidence of competition, or even that Barking Owls are the inferior competitor (e.g. The Barking Owls at Cottadidda may have perished allowing for the Powerful Owls to invade), but interactions between the two species may require further investigations.

This and previous surveys present evidence that the Barking Owl is continuing to decline in south-west New South Wales, with only a few scattered pairs left. If the causes of decline are related to habitat loss, reduced flood frequency and/or insufficient densities of hollow-bearing trees, little can be done to reverse this decline considering existing economic and environmental constraints. Creating habitat at the scale required for viable populations of Barking Owls is presently unattainable. Fewer wetlands are likely to receive regular flood-waters under current climate change projections and continued river regulation (Chiew and McMahon 2002, Chong and Ladson 2003). If Barking Owls require densities of hollow-bearing trees greater than what is presently available, it will be a number of decades before substantially more hollow-bearing trees could be recruited (Thomson *et al.* 2008). Focus for conservation for this species would therefore likely have much greater chance of success in the remaining hotspots for this species in southern Australia: the Pilliga and Chiltern/Mt Pilot National Park.

This study largely answered the two questions posed. Barking Owls have continued to decline in south-west NSW. It suggests their listing under the NSW *Threatened Species Conservation Act* 1995 may have to change from Vulnerable (Schedule 2) to Endangered (Schedule 1) to provide further support to conservation efforts under way in places they appear to be secure (e.g. the Pilliga). In response to the second question posed: Powerful Owls are present in south-west NSW State Forests. Adding this species to conservation strategies in the region (e.g. GHD 2009) is essential.

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